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New Fossil Rodents from the Early Oligocene Rancho Gaitan Local Fauna, Northeastern Chihuahua, Mexico

by

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New Fossil Rodents from the Early Oligocene Rancho Gaitan Local Fauna, Northeastern Chihuahua, Mexico[1]

BY ISMAEL FERRUSQUIA-VILLAFRANCA[2] AND ALBERT E. WOOD[3]

ABSTRACT

One new genus and three new species of rodents are described from the early Oligocene of Chihuahua. *Mytonomys gaitania* is a paramyid slightly more advanced than species from the late Eocene of Utah and California. *Jaywilsonomys,* new genus, with two new species, is a cylindrodont apparently descended from the late Eocene *Pareumys.* The Chihuahua deposits are probably slightly later than the late Eocene Myton of Utah and probably appreciably earlier than the early Oligocene Capote Mountain Tuff of Trans-Pecos Texas.

INTRODUCTION

A collection of fossil mammals from northeastern Chihuahua, Mexico, was recently described as the Rancho Gaitan local fauna by the senior author (Ferrusquia, 1967). These fossils were found in an unnamed formation (Heiken, 1966), a portion of the Vieja Group separated from the more studied parts of that Group by the Rio Grande. The stratigraphic column is different on the two sides of the river, and correlation must be on the basis of the included fossils.

Ferrusquia (1967) showed that the Rancho Gaitan local fauna is comparable to the faunas of the Chambers Tuff of Presidio County, Texas (Wilson, Twiss, DeFord and Clabaugh, 1968), and hence early Oligocene. However, the rodents of the Rancho Gaitan are not included among the 14 rodent species in the Chambers Tuff. The close similarity of one of the Rancho Gaitan rodents to *Mytonomys robustus* of the late Eocene of northeastern Utah suggests that the Rancho Gaitan may be slightly earlier than the Chambers. On the other hand, a single broken lower molar, from the Airstrip local fauna, Capote Mountain Formation (Wilson, Twiss, DeFord and Clabaugh, 1968), is referable to the new genus, *Jaywilsonomys,* from the Rancho

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Gaitan, and seems to be an evolutionary derivative of *J. pintoensis*. This might indicate that the Rancho Gaitan is slightly later than the Chambers. The best guess, however, would be a date somewhat closer to the Myton than to the Capote Mountain.

The rodents of the Rancho Gaitan local fauna have been restudied by Wood in connection with his work on all the rodents from the Vieja Group. It has seemed most appropriate to describe the new forms jointly, as a preliminary paper, since the present state of knowledge of the subject would not have been reached without the efforts of both authors. The conclusions as to the relationships of *Jaywilsonomys* were originally reached by Ferrusquia (1967). Detailed discussion of relationships and significance of the materials will be included in Wood's study of the Vieja rodents.

The locality numbers are those given by Ferrusquia (1967), and shown on his geologic map (Plate I). Abbreviations are: IGM, Instituto de Geologia de la Universidad Nacional Autonomo de Mexico, Vertebrate Fossil Collection; and UTBEG, University of Texas, Bureau of Economic Geology. This study was assisted by grants to Wood from the National Science Foundation, GB-6075, and from the Marsh Fund of the National Academy of Sciences.

Family PARAMYIDAE[4]

Mytonomys gaitania[5] new species

Fig. 1

Holotype.—IGM 65–21, fragment of a lower jaw containing LM_3.

Hypodigm.—Type only.

Diagnosis.—Similar to *M. robustus,* but about ten percent larger; trigonid basin opens freely into talonid basin; ridges into talonid basin poorly developed; small stylid between protoconid and hypoconid; mesostylid very small for *Mytonomys;* hypoconulid anterad of hypoconid; M_3 supported by four roots, and talonid of M_2 by two; anterior margin of coronoid process passes alveolar border opposite rear of M_3; incisive alveolus ends beneath posterior end of M_3.

Horizon and Locality.—Upper tuff member, unnamed formation of Chadronian age, 32 km. northwest of Ojinaga, Chihuahua; Ferrusquia (1967) locality No. 5.

DESCRIPTION

This species is closer to *M. robustus* from the late Eocene of the Uinta Basin of Utah than to *M. burkei* from the late Eocene of California. The

[4] We do not follow Black (1968a) in including these rodents in the Family Ischyromyidae, for reasons that will be discussed in detail elsewhere, by the junior author.

[5] Named for the Rancho Gaitan, Municipio de Ojinaga, Chihuahua, home of the Molinar family, from whom the senior author received much friendly assistance.

teeth of the latter are much more complex (Wood, 1962, p. 227–231).

The tooth of this specimen measures 7.55 mm. in length, approximately 5.7 mm. across the trigonid, and 5.52 mm. across the talonid.

The outstanding feature of this species is its rather simple pattern, with no crests, except the buccal crest from the protoconid, entering the talonid basin (Fig. 1 A). The basic pattern, however, is clearly that of *Mytonomys*. The mesostylid is smaller than on any previously known M_3 of the genus, perhaps because the tooth seems not quite as elongate, proportionately, as in the previously known species. The free backward opening of the trigonid basin is more similar to *M. burkei* than to *M. robustus* (Wood, 1962, Fig. 84). The backward displacement of the hypoconid is distinctive (Black, 1968b, Fig. 1), though the initial stages of such a change are suggested in *M. burkei*.

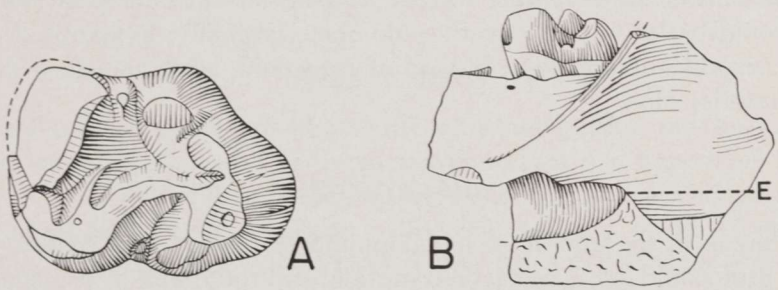

Fig. 1. *Mytonomys gaitania*, new species, Holotype, IGM 65–21, left lower jaw fragment containing M_3. A. Crown view of LM_3, × 5. B. Lateral view of jaw fragment, × 2. E = posterior end of incisive alveolus.

The short incisor, ending beneath M_3 (Fig. 1 B), has not previously been noted in this genus. The ascending ramus passes the alveolar border near the rear of M_3, slightly farther forward than in *M. robustus* (Wood, 1962, Fig. 84 E), but agreeing exactly with the situation in *M. burkei* (Wilson, 1940a, Pl. 2, Fig. 1).

Although this animal is considerably larger than any specimen previously referred to the genus, the difference is not sufficiently great as to justify specific separation on this basis alone. However, the size difference, together with the simpler tooth pattern, warrants the erection of a new species.

This is the first Oligocene occurrence of the genus, which has hitherto been known only from the late Eocene (Wagonhound and Myton Members of the Uinta Formation and the Duchesne River Formation of Utah and the Tapo Ranch local fauna of the Sespe Formation of California). *M. robustus* is a possible ancestor of *M. gaitania*, although *M. burkei* probably is not. The differences between *M. robustus* and *M. gaitania* are not great, and it does not seem likely that there was very much interval between the times of deposition of the Myton and of deposition in northern Chihuahua.

Family CYLINDRODONTIDAE

Jaywilsonomys new genus[6]

Type species.—*J. ojinagaensis* new species.

Referred species.—*J. pintoensis* new species.

Diagnosis.—Metaconules of upper cheek teeth connect with posteroloph rather than with hypocone; hypocones of M^{1-3} considerably linguad of protocones from which they are only faintly separated, so that protocone and hypocone form a diagnonal crest; P^4 essentially triangular, apparently with no hypocone; metaconules usually larger than metacones; strong marginal anterolophid connecting protoconid and metaconid of lower molars; metalophulid II, from protoconid across rear of trigonid to metaconid, interrupted at its middle, leaving one portion attached to protoconid and one to metaconid or anterolophid, so that trigonid basin drains posteriorly; the two talonid basins of lower teeth wide open, lingually; hypolophid usually with a cusp-like enlargement buccad of entoconid; lower incisor with a flattened anterior face.

DESCRIPTION

The break in the middle of metalophulid II (Wood and Wilson, 1936), with a protoconid and a metaconid portion, and the frequent presence of an extra cusp in the hypolophid separate this genus from all other cylindrodonts. The flattened lower incisor is quite different from what is found in *Pseudocylindrodon* and *Cylindrodon*. The diagonal protocone-hypocone crest and the attachment of the metaconule to the posteroloph are accentuations of conditions in *Pareumys*.

As indicated by Ferrusquia (1967, p. 33–34), *Jaywilsonomys* is closer to *Pareumys* than to any other previously described cylindrodont. It differs from it, however, in being considerably more hypsodont and in the peculiar incomplete metalophids of the lower molars. In *Pareumys* (Wilson, R. W., 1940b, Pls. 1, 2) the crest from the protoconid bends, halfway across the tooth, and runs into the posterior slope of the metaconid, as is also the case in *Mysops* (Wilson, R. W., 1938, Figs. 8–9). The situation in *Jaywilsonomys* has presumably been derived from that of *Pareumys* by an interruption of the central part of this crest.

Jaywilsonomys is an Oligocene descendant of *Pareumys*, somewhat larger and more hypsodont, and with interrupted metalophids on the lower teeth. The *Pareumys-Jaywilsonomys* line still seems to be as isolated from other cylindrodonts as Wilson thought it to be (1940b, p. 107) when he pointed out that there seemed to be no Oligocene descendants of *Pareumys*.

[6] Named for Dr. John Andrew Wilson.

Jaywilsonomys ojinagaensis new species[7]

Fig. 2

Holotype.—IGM 65–24, a badly damaged skull with LP^4–M^3 and associated lower jaws with RP_4–M_3 and LM_{1-3}.

Hypodigm.—Holotype and IGM 65–25, lower jaw fragment with damaged RM_{2-3} and the incisor.

Diagnosis.—Large species; diagonal nature of protocone-hypocone crest very prominent; lingual height of crown of unworn upper teeth about three times buccal height; arm from protoconid toward metaconid very prominent on molars, even when unworn; trigonid basin of P_4 opens anteriorly; crestlet from ectolophid of P_4 reaching toward a posterior crestlet from the metaconid, in addition to a metalophid; measurements as given in Tables 1–2.

Horizon and Locality.—Upper tuff member, unnamed formation of Chadronian age, 32 km. northwest of Ojinaga, Chihuahua; Ferrusquia (1967) locality No. 7.

DESCRIPTION

The skull is badly damaged, missing the antorbital portion and the occiput. All three lower jaws are also badly damaged, so that it is impossible to determine their shapes or the position of the mental foramina. This species is the largest known North American cylindrodont, being about 15 percent larger than *Sespemys* sp. (Wood, 1937, p. 208–209), if that form is actually a cylindrodont. The teeth increase in size from P^4_4 to M^2_2; the last molars are slightly smaller than the second ones.

TABLE 1

Measurements (in mm.) of upper teeth of *Jaywilsonomys*

	J. ojinagaensis, n.sp., Holotype, IGM 65–24	*J. pintoensis*, n.sp., IGM 65–26
P^4–M^3	13.1	
P^4 anteroposterior	2.95	
width, protoloph	ca. 3.5	
M^1 anteroposterior	2.98	2.20
width, protoloph	4.75	2.97
width, metaloph	4.60	3.04
M^2 anteroposterior	3.35	
width, protoloph	4.82	
width, metaloph	4.65	
M^3 anteroposterior	3.34	
width, protoloph	4.42	
width, metaloph	4.16	

[7] Named for Ojinaga, Chihuahua, the nearest town to the locality where the species was found.

The upper premolar (Fig. 2 A) is badly damaged. Fortunately, this occurred after a drawing had been made of it by Mrs. M. S. Stevens (Ferrusquia, 1967, Fig. 7 A) and the present restoration (Fig. 2 B) is based on her drawing. There clearly does not seem to have been a very prominent hypocone, the lingual tip of the triangular tooth being the protocone, but the area behind and buccad of the protocone may have been a hypocone. The metaconule is apparently much larger than the metacone. Both anterior and posterior cingula were short.

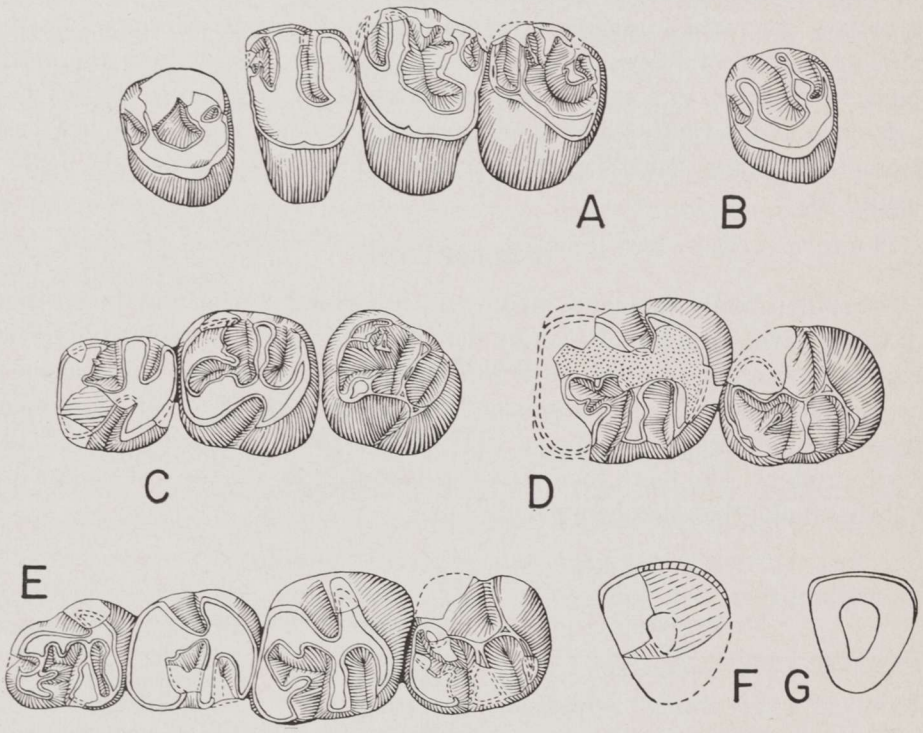

Fig. 2. *Jaywilsonomys ojinagaensis*, new genus, new species. × 5. A–C, E–F. IGM 65–24, holotype. A. P^4–M^3 left. B. Restoration of LP^4. C. M_1–M_3 left. E. P_4–M_3 right. F. I_1 right, restored from broken part within alveolus and from shape of alveolus. D, G. IGM 65–25, right. D. M_{2-3}. G. Cross section of incisor below M_2.

There was no mesostyle on M^1, but prominent ones are present on M^{2-3}. The incomplete metalophs are very obvious, especially on unworn teeth (Fig. 2 A), as is also the diagonal alignment of the protocone-hypocone crest, which is parallel to what seems to be the protoconule–protocone crest of P^4. The hypocone of M^3 is very prominent. Small crests extend backward from the paracones of M^{2-3}, which may or may not be of taxonomic importance.

The trigonid basin of the lower premolar opens anteriorly (Fig. 2 E). In addition to the metalophid, a crest from the ectolophid extends toward one

TABLE 2

Measurements (in mm.) of lower teeth of *Jaywilsonomys*

	J. ojinagaensis n.sp.			*J. pintoensis* n.sp						
	Holotype, IGM 65–24		IGM 65–25	Holotype, IGM 65–28A	IGM 65–22	IGM 65–23	IGM 65–27A	IGM 65–27B	IGM 65–28B	IGM 65–28C
	L	R	R	R	R	L	L	L	L	R
P_4–M_3		14.50		9.53						
P_4 anteroposterior		3.26		2.32			2.16			
width, metalophid		2.26		2.00			1.52			
width, hypolophid		2.92		2.93			1.84			
M_1 anteroposterior	3.18	3.40		2.11						
width, metalophid	2.92	3.09		2.74						
width, hypolophid	3.14			2.75						
			over							ca.
M_2 anteroposterior	3.64	3.86	4.5	2.02	2.01	2.34		2.30	2.51	2.2
width, metalophid	3.55	3.73		2.58	2.32	2.21	ca. 2.3		2.80	
width, hypolophid	3.62	3.80	4.26	2.50	2.29	2.22	ca. 2.3		2.78	
M_3 anteroposterior	3.80	3.80	4.35	2.65	2.13				2.62	2.46
width, metalophid	3.57	3.70	3.67	2.68	2.18				2.57	
width, hypolophid	3.40	3.39	3.47	2.50	1.86				2.26	2.29
			ca.				2.40			
I_1 anteroposterior			3.15	2.65	2.07		*2.26	2.17		
							*2.05			
transverse	ca. 2.8		2.88	2.40	2.04		2.20	2.10		2.11
							*.91			
ratio			ca. .92	.91	.98		.92	.97		

* Anterior end of juvenile tooth

that runs backward from the metaconid. The basin between the hypolophid and posterolophid is closed lingually after little or no wear.

The protoconid and metaconid crests, at the rear of the trigonid basins, are prominent on all molars. In most cases, it looks as though the trigonid basins drain freely backward, but occasionally (Fig. 2 C, M_2) the basin seems to be deeper than its outlet. An extra crest may be present from the metaconid (Fig. 2 D, M_2). The hypoconulid of M_3 may be prominent, even in unworn teeth (Fig. 2 D). All lower teeth clearly show a prominent enlargement in the hypolophid between the entoconid and the ectolophid.

The upper incisors are unknown. The lower incisors (Fig. 2 F, G) have a slightly rounded anterior face, with the enamel reaching nearly to the middle of the lateral face and well onto the lingual side. The enamel appears not to have been pigmented.

Jaywilsonomys pintoensis new species[8]

Fig. 3

Holotype.—IGM 65–28A, right lower jaw with incisor and P_4–M_3.

Hypodigm.—Holotype; IGM 65–22, jaw fragment with RM_{2-3} and incisor; 65–23, isolated, broken LM_2?; 65–26, isolated right upper molar; 65–27A, left jaw with incisor and unworn P_4; 65–27B, left jaw with incisor, part of M_1, and damaged M_2; 65–28B, left jaw with M_{2-3}; and 65–28C, right jaw with broken M_{2-3} and incisor. IGM Nos. 65–26, 65–27A and 65–27B were found in the same nodule.

Diagnosis.—Much smaller than *J. ojinagaensis;* P_4 without the extra crests in the trigonid region seen in the genotype; trigonid basin of P_4 may open either forward or backward; metalophulid II crests weak, but of variable size; intermediate cusp of hypolophid also of variable size; only known upper molar with protocone-hypocone crest nearly anteroposterior, no complexities on protoloph, and no mesostyle; lingual height of crown of upper molar about twice the buccal height; measurements as given in Tables 1–2.

Horizon and Locality.—Upper tuff member, unnamed formation of Chadronian age, 32 km. northwest of Ojinaga, Chihuahua; Ferrusquia (1967) localities Nos. 2 and 7.

DESCRIPTION

The upper molar (Fig. 3 A) is either M^1 or M^2. It is tentatively identified as M^1 by comparison with the teeth of *J. ojinagaensis,* because there is no mesostyle, and the protocone-hypocone crest is not as diagonal as in M^2 of the genotype. The crests are more smoothly curved than in the teeth of the larger species. The lingual height is about twice the buccal, whereas in *J. ojinagaen-*

[8] The specific name is derived from the Cerro Pinto, the main topographic feature near the localities where the specimens were found.

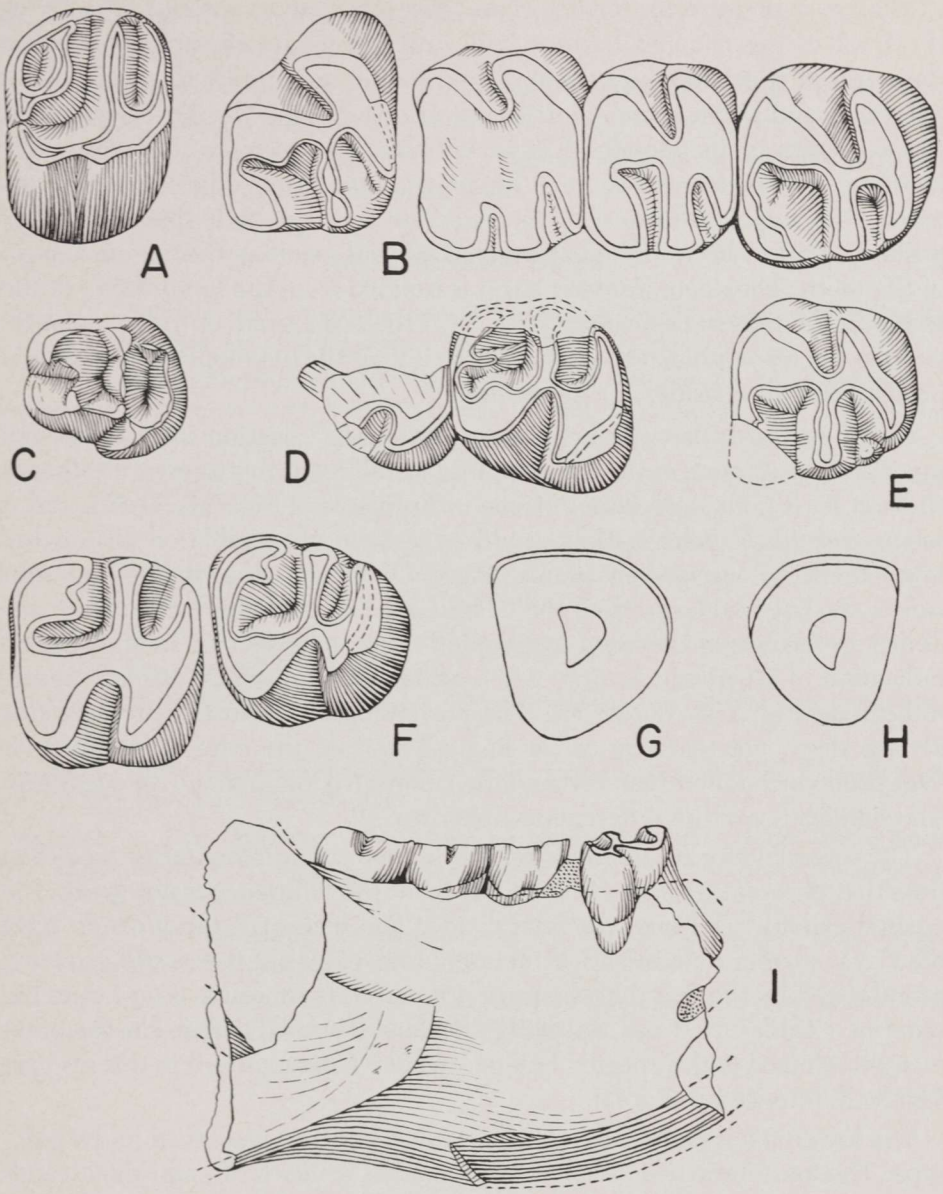

Fig. 3. *Jaywilsonomys pintoensis*, new species. Jaw × 5; teeth × 10. A. IGM 65–26, right upper molar (M^1?), anterior end to the right. B. IGM 65–28A, holotype, RP_4–M_3. C. IGM 65–27A, LP_4. D. IGM 65–27B, damaged LM_{1-2}. E. IGM 65–28C, RM_3. F. IGM 65–28B, LM_{2-3}. G. IGM 65–28A, holotype, cross section of RI_1 below P_4. H. IGM 65–27A, cross section of LI_1 below P_4. I. IGM 65–28A, holotype, lateral view of lower jaw.

sis, the lingual height of the slightly more worn M^2 is about three times the buccal height.

The lower teeth exhibit slight hypoconid hypsodonty (Fig. 3 I), most pronounced on the premolar.

The lower premolar of the holotype (Fig. 3 B) has an anterior dam across the front of the trigonid basin, which drains freely backward, whereas in the referred specimen, unworn and presumably unerupted, the basin opens anteriorly and seems to be dammed posteriorly (Fig. 3 C). There is a metaconid portion of metalophulid II in the referred specimen, but not in the holotype. The metaconid is much higher than the protoconid in the unworn tooth. The hypolophid has an intermediate cusp in both specimens. The posterolophid is shorter than in the genotype, not reaching the lingual margin of the tooth. The deep posterior basin is isolated from the lingual side of the tooth. In the referred specimen (Fig. 3 C) there is a small cusp-like enlargement of the ectolophid at the point where it joins the hypolophid. This should probably not be considered a mesoconid.

Although the lower molars show considerable variation in the development of the two parts of the metalophulid II, all teeth that preserve this area show at least faint suggestions of one or both parts (Fig. 3 B, D–F), and it seems clear that such crestlets would have been observable on all unworn lower teeth. In only one specimen (Fig. 3 D) does it seem that wear might isolate the trigonid basin from the talonid one. There seems to be more variability in the size of the extra hypolophid cusp, some specimens showing no indication of its presence (Fig. 3 F), although it is usually at least faintly indicated (Fig. 3 B, M_3; D; E). The posterolophid, as in the premolars, is always short, not reaching as far linguad as does the entoconid. There is very pronounced interdental wear, much more striking than in *J. ojinagaensis*. The significance of this difference is unknown.

The lower incisor has perhaps a slightly more rounded anterior face than does that of *J. ojinagaensis* (Fig. 3 G, H), but the difference is not great. The enamel extends well onto the lateral side. The incisor of the juvenile IGM 65–27A is smaller than the other incisors (Fig. 3 H), but it was still growing, as indicated by the fact that the posterior end of the tooth is larger than the anterior (Table 2). It has a slightly smaller incisor ratio than do the other incisors referred to this species, being more like *J. ojinagaensis* in this respect, but the difference is not great.

The lower jaw is damaged in all specimens, but best preserved in the holotype. The masseteric fossa seems to have ended beneath M_2, and the ascending ramus seems to have passed the alveolar border behind M_3. There is an area filled with matrix below the anterior tip of the anterior root of P_4 of the holotype, which may be the mental foramen. This area is not preserved in any other specimen. There are a large number of small nutritive foramina on the lingual surface of the mandible.

Jaywilsonomys pintoensis seems to be more primitive than *J. ojinagaensis* in the lesser lingual hypsodonty of the upper molars, in the simpler pattern of the anterior end of P_4, and in the lesser development of an intermediate cuspule on the hypolophids of the lower teeth. The greater interruption of

the metalophulid II is presumably an advanced character, if *Jaywilsonomys* is descended from *Pareumys*.

A broken lower molar in a minute fragment of jaw (UTBEG 40504–249), from locality 13, Capote Mountain Tuff of Trans-Pecos Texas, is similar to *J. pintoensis*, but more advanced. This suggests that the Chihuahua deposits are earlier than the Capote Mountain Tuff.

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